Engineering Heritage Australia

Newsletter of the National Committee on Engineering Heritage
The Institution of Engineers, Australia

Print Post Approved PP233744/00010

No. 3 *October 1994*

Our Engineering Heritage - Can You Help?

This issue features some of the many activities in the world of Engineering Heritage that are happening through Institution initiatives.

Our Engineering Heritage is important as one of the most significant elements of the European settlement and development of this country. Identifying and conserving works of significance gives a deeper and wider appreciation of the profession both internally and by the community generally.

The National Committee has many exciting projects in the planning stage as noted in the 5-year Plan on page 2. Of particular note are:

- Continuation of the highly successful Historic Engineering Marker programme which achieves excellent publicity for the profession.
- A possible Engineering Hall of Fame as a Year 2000 initiative.
- A proposed Engineering Heritage Foundation to provide the funds for long term conservation of significant works.

But the Institution is a Federal organisation and most of the work is carried out in the Divisions. Later pages of this issue give just a small sample of these activities.

As the appreciation of Engineering Heritage grows, so does the work involved in the ever expanding lists of significant engineering works. If these items are not identified and a conservation policy developed they are soon lost to the community forever.

All Divisions need more help. The hard working members of Division committees can no longer handle the growing demands. If you can spare a little time to help, why not contact your Division and come along to a local meeting? Involvement is very fulfilling.

Members of the NCEH

Tony Moulds	Chairman	Western Australia
Paul Hagenbach	Deputy Chairman	Sydney
Robert Breen	Executive Officer	Canberra
Deane Kemp		South Australia
Byrne Kenny		Canberra
Keith Drewitt		Tasmania
Don Fraser		Supernumary
Bill Jordan		Newcastle
Ken McInnes		Victoria
Bill Oliver		Queensland
Harry Trueman	Editor	Supernumary
Bruce James	(Corresponding Member)	Western Australia
Denis Cumming	(Corresponding Member)	Western Australia
John Moynihan	(Corresponding Member)	Western Australia
John Pollard	(Corresponding Member)	New Zealand
Charles Smith	(Corresponding Member)	Tasmania
Jim Whitehead	(Corresponding Member)	Victoria
Ray Whitmore	(Corresponding Member)	Queensland
Ian Bowie	(Corresponding Member)	Sydney

Committee Members of The National Committee on Engineering Heritage

The NCEH Rolling 5 Year Plan

The National Committee on Engineering Heritage met in April and prepared a 5-year Plan, to which our corresponding members have also contributed.

The next five years are important to us all, as they lead towards the mile-stone years of the Olympic Games, the year 2000, and of course the Centenary of Federation.

The Chief Executive of the Institution, Dr John Webster, is already familiar with our more important initiatives, which he considers excellent, and he has asked the NCEH to pursue these forthwith.

Whilst there are many heritage activities in our Divisions, the 'favourites' for the years ahead are likely to be:

- **An Engineering Hall of Fame - possibly at Cooma**
- **The placing of many Historic Engineering Markers across Australia**
- **The creation of a series of Engineering Walking and Driving Trails, integrated with the work of other local historical societies and Trusts**
- **A video recording The Impact of Engineering on the Quality of Life in Australia, from settlement until the year 2001**
- **Oral history**
- **Interlinked databases recording our Heritage artefacts**

The NCEH will pursue an evenness of effort across the Divisions and States, and will oversee that budgets are formulated ambitiously and spent in full to reflect the urgency of our work in the more fragile heritage fields. There will always be concern about the shortage of active members at the 'coal-face', but good programs attract both good people and good funding.

To compliment the Rolling 5-year Plan, the NCEH has re-drafted its Mission Statement as follows:

"The Institution is the custodian of the science, experience, art and practice of Engineering in Australia and has a duty to take an active interest in our engineering, industrial and technological heritage in terms of its social, environmental, cultural and conservation importance."

"The Committee's mission is to:

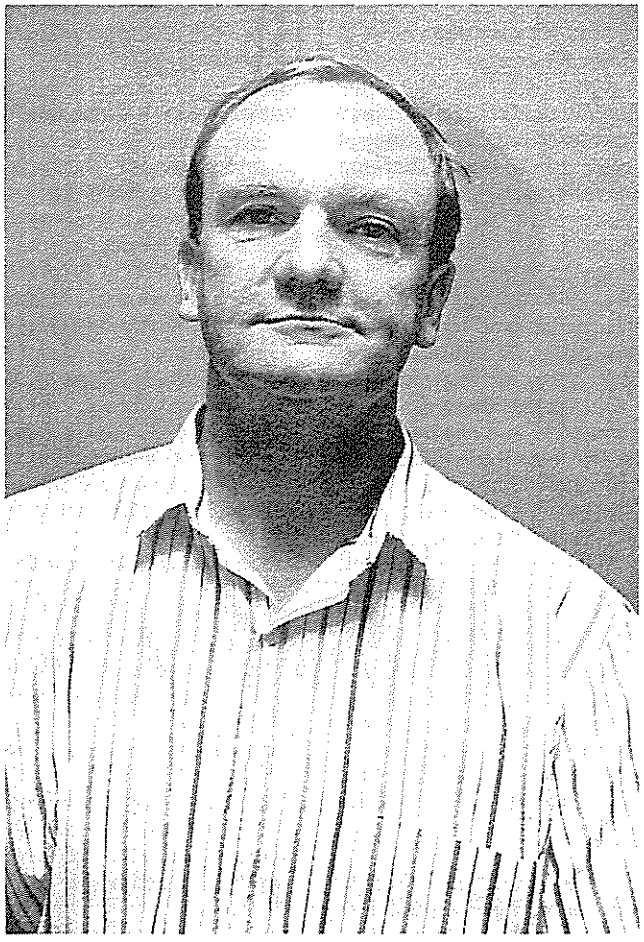
- Raise the awareness of the profession and the public of our engineering heritage and to increase awareness generally of the significant contribution made by engineers to the orderly development of Australia, and the welfare and health of its people.
- Foster consultative links with other bodies in the Heritage field.
- Develop and present a deeper and wider appreciation of what heritage means to the community generally, and of how engineering as a profession has and will contribute to the building of an Australian Self-perception.
- To develop the art and science of identifying and extending the useful life of engineering works of significance.
- To carefully record for posterity details of worthwhile items that may well cease to exist in the future."

A Profile - Tony Moulds, Chairman, National Committee on Engineering Heritage

My first contact with engineering heritage was as a young site engineer on underground works at Tower Hill in London in 1963. You couldn't break the ground there without digging up history, from Roman walls to Tudor vaults under the Tower of London, overlain with a network of Victorian sewers, drains and water mains dating back to the 1850's and beyond, all interlaced with trunk telephone cables and high pressure hydraulic mains serving the City of London's elevators. This was the time also of the Barbican redevelopment scheme, north of the City, when a Roman temple was rediscovered during excavation among the foundations and was subsequently incorporated as a museum in the final buildings.

In May 1965, shortly after gaining membership of the Institution of Civil Engineers, I forsook the innocence of East-end pubs, 'trad' jazz, au-pair girls and the Beatles, forked out my ten pounds and boarded a BOAC Comet migrant flight bound for Perth, Western Australia. At that time Perth was still recovering from staging the Commonwealth Games a couple of years previously and was just beginning to realise what was happening in the north-west, with its oil, gas and iron ore developments.

Cut to 1980, when Jim Paton first persuaded me to join the WA Division Engineering Heritage Sub-committee. By that time I had worked for the Water Board in Perth, the Water Conservation and Irrigation Commission in Sydney, got married, been back to the UK for a working holiday which extended to two years, arrived back in Perth (broke) and joined the Water Board again, and we had produced the first two of three sons and had 'traded-up' to our third old car and second home. By this time also I had reached an Executive Engineer's position, which first gave me access to, and an interest in the history and the engineering records of the Water Board, an interest which has abided.



Tony Moulds

In 1985 I took over the reins of the WA Division Heritage Sub-committee and subsequently attended my first National Committee meeting. With membership of the Division Heritage Sub-committee (later to become a Panel) came membership of the National Trust's Cultural Environment Committee and of a Consultative Committee set up to guide the handing over of the historic Fremantle Prison (1855 - 1992) to a management Trust.

The National Committee is very well founded, with top level representation in each State plus two very experienced heritage 'Godfathers' and superb support from Rob Breen and his staff in Canberra. For me, highlights of membership have been the biennial heritage conferences and study tours, the friendships I have made, and the biannual face-to-face meetings themselves which run for over five hours and are always highly stimulating.

Looking to the future, the National Committee has some exciting projects in its sights, eg, the First International Conference on Engineering Heritage in 1996, a formal archiving policy for the Institution, an engineering heritage Foundation and other significant national projects to mark the millennium.

For the WA Engineering Heritage Panel, a recent and increasingly important initiative is its co-operation with the Heritage Council of Western Australia in drafting an industrial heritage strategy for Western Australia and the organising this year of an inaugural State conference on the industrial heritage.

And for me personally? I would like to see formal identification of cultural heritage values, including engineering heritage values, in their planning processes and adoption of conservation policies by all State Government instrumentalities.

From the Divisions - Western Australia

An Industrial Heritage Strategy for Western Australia

Over the last few years, most of the places, buildings and structures that have been identified and listed by both the Heritage Council of W.A. and the National Trust of Australia (WA) have related to historic architectural buildings.

At the other end of the spectrum, the museums have made a valuable contribution to collecting and displaying the various historic artifacts that earlier generations used.

However, in areas such as agriculture, mining, forestry or marine activities where people worked, the machinery and plant which they operated, and the supporting service industries such as water, electricity, roads, railways and communications etc., have not in general, been identified, documented or conserved, particularly in Western Australia.

With this knowledge in mind, the prime focus this year has been to develop an Industrial Heritage Strategy for WA.

With the formation of a Consultative Committee of sixteen members representing the broad spectrum of heritage organisations and interests throughout the State last year, three small Working Parties have been active in developing a programme to formulate this strategy.

In mid June, a two-day Industrial Heritage Conference was held at Fremantle. The theme of the meeting was encompassed in its title "From Sailing Ships to Microchips". It was opened by the State Minister for Heritage, Mr Richard Lewis, MLA, JP, with the Chief Justice, The Hon. David Malcolm A O, giving the Keynote Address.

Over the two days, some 100 people listened to and discussed the presentation of eighteen papers which had been pre-printed and circulated to all participants before the Conference. The papers covered the existing field of general heritage works and then became focused on the desirable future conservation of two engineering projects that are currently under consideration by the Government, namely, the East Perth Power Station and the Railways Workshops at Midland, both of which are now closed.

At the final Plenary Session, it became very apparent that there was a large industrial heritage gap in the overall programs of heritage conservation. A draft document of a Proposed Industrial Heritage Strategy to overcome this shortfall was handed out to all in attendance. No discussion on the draft was made as it was intended that each participant would take it back to their respective organisation for consideration.

It was agreed that a half-day Workshop would be held in October to consider the thrust of the document and finalise the wording before passing it on to the Heritage Council of Western Australia for their consideration for adoption.

Engineering Heritage Plaquing Programme

The Panel has also been successful in gaining approval for an Historical Engineering Marker plaque to be erected at the Perth Wireles Station site, which was initially commissioned in 1912 at Applecross, Perth, and operated for over fifty years before its decommissioning in 1967. Currently, an application is being developed for a similar plaque to recognise the Rottnest Island Light Station.

Meeting of the "Heavies" in Industry and Government

Once again, a gathering was held in March at the Divisional Headquarters in Perth for the Western Australian Minister for Heritage, Mr Richard Lewis, MLA JP, senior members of a number of Government Departments and Corporate Bodies together with Members of the Division Engineering Heritage Panel.

The Institution explained its interest in identifying, documenting and, if possible, conserving items of significant engineering heritage in WA before they are destroyed. Members of the Division offered their expertise to help identify and classify such items of heritage value.

75th Anniversary Recognition

To officially commemorate the 75th anniversary of the formation of the Institution, it has been agreed to locate suitably worded plaques on four major engineering projects that have not been so recognised in the past.

Professor Jack Cowan A O, Eminent Speaker

In mid June, we were privileged to have Professor Jack Cowan address a joint meeting with the Structures Panel at which he gave a paper entitled "The Growth of the Building Technology of South-East Australia from its Primitive Beginnings in the 18th Century to the Introduction of Steel and Concrete Construction". The paper detailed clearly some of the problems of the early pioneers in the building industry in Australia.

Professor Carlo Viggiani, Eminent Speaker

The evening of Tuesday 2nd August saw the Octagon Theatre at the University of Western Australia holding some 300 persons listening intently to Carlo's brilliant illustrated address entitled "The Tower of Pisa: An Italian History".

Bibliography of Retired Engineers

The program to record the "curriculum vitae" of retired Western Australian engineers is continuing. Much valuable information is being collected which will be of great value in piecing together the contribution of engineers to the development of the State.

National Estate Grants Program 1993 / 1994

In February, the Engineering Heritage Panel was awarded a grant of $11,000 to carry out a survey of Large Timber Structures in Western Australia. Mr Denis Cumming has agreed to undertake the study which is due for completion by March 1995.

Heritage Co-operation

A close co-operation continues to be maintained with both the Heritage Council of Western Australia and the National Trust of Australia (WA). Panel members are active on both the Cultural Environment Committee and the Railways Heritage Committee of the National Trust as well as on the Board of the Heritage Council.

From the Divisions - Victoria

The Engineering Heritage Branch has had a great spurt of activities with other groups over the past few months.

The Study of Timber Bridges in Victoria being conducted by the National Trust is progressing steadily. The Steering Committee has representatives from a number of agencies and bodies including the IEA Engineering Heritage Branch. A data base of known timber bridges has been established, and a questionnaire has been forwarded to all historical societies, local government and state government departments and agencies to elicit more material and to ensure that we have listed all remaining timber bridges. Field survey sheets are being trialed before the more notable bridges are recorded in the field.

The Historic Buildings Act for Victoria is under review, and a new Heritage Council is proposed. At present the Historic Buildings Council comprises Members, and Deputy Members selected by the Minister from nominations submitted from various bodies listing in the Act, including the Institution of Engineers. Currently Julie Lamborn is the Member and Ken McInnes is the Deputy Member nominated by the Institution of Engineers. Under the proposed Heritage Act the selection process will be wider and no longer will nominees from various bodies be guaranteed representation, nor is it certain that engineers will be members of the Heritage Council. Nevertheless, the aim is still to have Council members with a broad spectrum of experience and knowledge so it is possible that engineers may still be Members.

With the rationalisation, corporatisation and privatisation of many aspects of the public service and utilities in Victoria, and the total rationalisation of municipal government, historical records as well as historic structures are being disposed of, at an alarming rate.

Seemingly, many structures are being demolished simply because they have no asset value on the accountant's books, but they might cost money in the future for maintenance, or be a liability to a "Business".

The Yallourn Power Station complex is such a structure that is threatened with demolition. The Yallourn Power Station Complex, which comprises Turbine Hall A from the 1920s, Turbine Hall B from the 1930s, C Power Station from the 1940s, D Power Station from the 1950s, E Power Station from the 1960s and E Power Station's award winning smoke stack retrofit in the 1970s, is all scheduled for quick demolition - "... to create some important short term jobs ..."

The complex , the largest coal fired power station in Australia from the 1940s to the 1960s, has been proposed for registration by the Historic Buildings Council, and possible use as a Yallourn Brown Coal Power Museum and Power Station Training Centre. It contains Australian Made Turbines, and many other items of interest. Whilst built as a separate Power Stations, the vast turbine hall is basically one building with different fenestration details reflecting its construction periods.

The owner (Generation Victoria, a State owned business) has objected to registration, has put "the fear of asbestos" into the community, and argues that demolition will create important jobs. They have no plans for the site if the Power Stations are demolished. Probably the real reason for them wanting demolition is to remove the embarrassment that a Power Station that ceased operating in 1989, and it is now supposedly in stand-by mode, has been allowed to deteriorate, be vandalised, and for interesting heritage items to be souvenired, probably by staff.

It was disturbing to see on TV the demolition of concrete silos in Newcastle. From the images on TV these looked like very early concrete structures from around 1915-1920. What is the story behind these? How old were they? Why were they demolished (blown up three times)?

From the Divisions - Canberra

Canberra Division Heritage Panel activities over recent years have focussed on community involvement as well as specific engineering heritage projects. The relative growth of Canberra as a city may seem inconsistent with "heritage", Nevertheless preservation and recording interests are alive and active in the community.

The Panel emphasises its association with other heritage bodies by its individual members - they are active in the National Trust's activities, Australian Heritage Commission projects, and in various local groups with specific historical concerns.

Many engineering heritage works in ACT were (or are) related to electricity and water supply for the city. The asset owner (ACT Electricity and Water) is very appreciative of the heritage interest, and is supporting a Panel initiated research project by University of Canberra at the original Cotter Pumping Station. This project is part of the University's undergraduate research.

Planning for the centenary 1995 of the oldest ACT bridge is well underway. This is arguably the oldest significant engineering work in the area and is a fine example of the Allan Bridge Truss developed by NSW Public Works engineer Percy Allan in late 19th century. Restoration and renovation of the bridge has recently been completed by ACT Government, and its continuing operation (after 100 years !) is closely linked with the history of inland development in Australia.

From the Divisions - Newcastle

Shaping the Hunter

The book "Shaping the Hunter" was first printed in 1983, after a challenge from a retired member of Newcastle Division of the Institution of Engineers, Australia to write a history of engineering enterprise in the Hunter Region.

The idea was eagerly supported by members at that time and a subcommittee set about collecting information and enlisted people with first hand knowledge in their respective areas to research and write chapters.

The introduction of the book notes:

> "This is a story of patience in establishing roads and taming a river and the sea; initiative, ingenuity and skill in building machines which could not be bought or imported, teamwork in establishing a new great industry, steady unsung service to the community and more."

Shaping the Hunter is the story of the development of the Hunter Valley from days of settlement through to the establishment of roads, harbour development, railways, gas, electricity, water. These aspects all required engineering services and the book highlights the people involved in their engineering development.

The book was reprinted in 1987 as the original print run was exhausted. In 1992, a member of the Division, who was active in community radio suggested to the Division Committee that the book "Shaping the Hunter" would be suitable to be serialised into a radio program. Community Radio 2NURFM was approached and they took up the task.

The radio serialisation has reduced a book of 12 chapters down to four radio programs, however the reduction has not lost the content of the book, but actually brings the stories to life. The book has some great photographs to help the storyline, but the radio program through voices and sound effects really enhances the story.

2NUR has done an excellent job in creating a very easy listening story. People living in the Hunter will identify the sounds of the Hunter as the story is told. Many of the stories are probably well known, but the program does also invoke the response, "is that how it happened?"

Some 60 people were involved in the research of the radio program, many interviewed and heard in the program. Most of the stories are first hand experiences which adds to the informative nature of the story line, and there are also some humorous anecdotes. The program has produced a montage of sound and visual concepts that gives an objective, factual account of the Engineering Heritage of the Hunter.

The radio program has been produced as both a double compact disc set and double cassette tape set. The books, CD's and tapes are available from Newcastle Division Office, Tel: (049) 26 4440, Fax: (049) 29 7121.

Cost	Compact Discs	$25.00
	Cassette Tapes	$15.00
	Soft Cover Book	$14.50
	Hard Cover Book	$19.50
or	Buy a hard cover book and compact disc and pay only $39.50	

* * * * *

Angus Buchanan's book, "The Power of the Machine" has now been released by Penguin in paper back. It was interesting to note from the biographical note that Angus was awarded the OBE in 1993.

From the Divisions - South Australia

The activities of the branch have in the main followed the pattern of previous years albeit at a lightly lower level with both Ron Stewin and Bill Stacy being on leave for the majority of the year. In this year we have trialled combining with other branches for joint activities which has proven successful.

Branch activities undertaken and planned are summarised:

February 16 Construction of the Bulldog-Wau-Lau Road, New Guinea - 1943

This was a joint meeting with the Military Engineering Society at which Jack Holton former army field engineer, graphically described the construction of this strategically important road built by 3300 men at altitudes up to 10,000 feet and in up to 200 inches annual rainfall. The road of 57 miles length was constructed in 8 months and then only used for a year or so. (Attendance 22).

April 14 Film Night

A selection of 5 short 16mm films was shown on both our engineering and cultural heritage in South Australia. (Attendance 19).

June 20. Air conditioning Roman Style and Lessons for Today

Illustrated lecture by Eminent Australian Speaker, Professor Jack Cowan on changing concepts of thermal comfort and their effect on energy consumption.

This was a joint meeting with Mechanical and Manufacturing Branch with invitations also being extended to the Australian Institute of Refrigeration Air Conditioning and Heating. (AIRAH). (Attendance 75).

August 11, Traders Under Sail, The Cutters, Ketches and Schooners of South Australia

Captain Jim Gillespie, retired master and harbour master, delivered an illustrated address based on his recently launched book of the same title. (Attendance 27).

Forthcoming activities are as follows:

October 16 - Wings Water and the Port

Another stimulating field day to Port Adelaide incorporating a conducted visit to the Aviation Museum, Plaquing of the Jervois Bridge, lunch in a railway dining car and plying the Port River aboard the steam tug Yelta.

November 17 - Heritage Engineering USA: A Personal Odyssey

A talk by Bill Stacy who has just spent two years working in the USA.

Liaison

The branch continues to maintain contact with other groups and agencies with interest that parallel those of the I E Aust. These include the NTSA, History Trust of South Australia and the State Heritage Branch. D C Kemp, Engineering Heritage Branch Chairman has been appointed to the State Heritage Authority.

The History Trust is setting up a Technology Advisory Committee to assist the curator of Technology to actively enhance the understanding and preservation of the South Australia Technological heritage. The I E Aust has welcomed the formation of the Committee and the invitation to participate. An important task being undertaken by the History Trust at the suggestion of the I E Aust is the securing of storage space to permit the retention of important technological items such as the Australian prototype of the now common photo copier. The prototype has been recently found and stored for future interpretation.

As an outreach initiative, the I E Aust provided Professor Jack Cowan for a joint meeting of the History Trust of SA, the State Heritage branch and their colleagues, where he delivered a well received address on "the Growth of the Australian Building Technology".

Projects and Advice

The Committee has provided editorial material on an eminent engineer for inclusion in the Australian Dictionary of Biography; and advised on heritage matters in connection with a jetty on Kangaroo Island and refrigeration plant circa 1920 currently in the possession of the University of South Australia.

We have advisory representation via John Pickles on the RARE (Restoration of Ancient Refrigeration Equipment) Committee formed to restore to working order Australia's oldest surviving refrigeration installation. This is a significant "find" and undoubtedly deserves in due course an Historic Engineering Marker.

Other project wishes have not been vigorously pursued due to availability of human resources.

Plaquing

Nomination of the Jervois Bridge for an Historic Engineering Marker has been prepared under the guidance of Hugh Orr. It is anticipated that this relic from South Australia's only swing bridge (1878) will be commemorated during the October field day. A nomination for a 100 years of public electricity supply is in preparation with 30 more items awaiting attention.

Records

During the year the City of Burnside donated to the Institution a video and photographic record of their now decommissioned and demolished asphalt manufacturing plant built in 1958.

Text books and photographs have also been gratefully received from the family of the late Harry Hodson, National President of the I E Aust in 1967.

From the Divisions - Queensland

Honour Well Deserved

Despite being a (i) Queensland (ii) engineer (double disadvantage), Ray Whitmore got up for a very well deserved award in the Queen's Birthday Australian Awards list, with an "AM". Sorry about the old letterhead stock, Ray. Don't buy too much replacement stock: you'll soon render that obsolete with your next lot of titular letters.

Ray Whitmore

Biographies Programme

The Queensland Biographies Programme, based on the IPENZ format reported by John Pollard, continues. Sub-committee meetings precede the main panel meetings, and Alan Wickham has organised the extensive material subscribed by more than 50 Queensland members into an ordered but not computerised database. Periodic publicity will be used to maintain the impetus of this very successful programme, which is obviously fulfilling a need and providing a service for members.

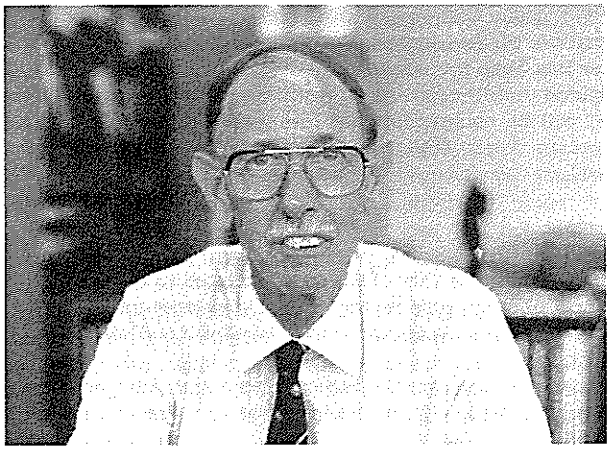
Eminent Queensland Engineers: A Second Edition?

It is now 10 years since the publication of "Eminent Queensland Engineers", one of many initiatives of the era of Ray Whitmore's chairmanship of the Queensland Heritage Panel. Potted biographies of about 300-400 words and photographs of 34 Queensland engineers comprise the collection. Plans are in hand for the next edition, and requests for help from all Queensland engineers will go out in the near future, the new edition will cover two main categories of eminent engineers; (i) early engineers not, for

one reason or another, covered in the first edition; and (ii) engineers of more recent times whose date of death disqualified their biographies from inclusion in the first edition. Copies of the 1984 edition are still available, for $10.00 including postage within Australia. This excellent reference book is in increasing demand and destined to become a collector's item, as the recent price hike indicates: it was until recently $5.00 plus postage.

Ecumenical Church Service

A copy of "Eminent Queensland Engineers" was one of several gifts dedicated at the Annual Ecumencial Church Service at St John's Cathedral on 5th September 1994. Offering the book as one of seven symbols of the wide-ranging endeavours of the profession to manage the resources of nature for the benefit of all people, to the great glory of our God and Creator, Bill Oliver announced: "This book on eminent engineers pays tribute to people who by their efforts have contributed to the well-being of others for the common good". The moving force behind the annual Ecumencial service, held each year in National Engineering Week, is Heritage Panel member, Eric Brier. (Mysterious way in Queensland?)



Eric Brier

50 Years of Cairncross Dock

To commemorate the 50th anniversary of the completion in 1944 of the Cairncross graving dock, constructed in considerable haste after the battle of the Coral Sea in 1942, Eric Brier presented (in April) an illustrated paper on the drydock. In both compiling and presenting his paper, Eric was fortunate to have the assistance and guidance of Evan Richard, who was Construction Manager of the dock at the time when Eric was but a cadet on the same quite outstanding project. Before going off in RAAF uniform to the Pacific to build airfields, Evan became the first human ever to swim the length of the good dock Cairncross. *See page 19*

Cairncross Dock: the next 50 years

After lying dormant for several years, this formerly Government owned and operated asset is to re-open later this year under private ownership and operation. The new Singapore-based owners are, by Queensland (and possibley Australian) standards, unusually heritage-conscious, and are very receptive of the proposal for an Institution Historic Engineering Marker to be placed at the drydock during the re-opening ceremony, which will be close to the Institution's 75th anniversary.

Radio Heritage at Bald Hill

Bald Hills, an outer northern suburb of that quaint city Brisbane, is the home of an outstanding transmitter, bearing the name VLQ9. It is over 50 years old and in an extremely good state of preservation, having been in regular service until very recent years. It is very largely of Australian manufacture, and entirely of Australian design. Panel member Doug Sanderson, now retired from the Commonwealth Public Service, will be presenting a paper at the Queensland panel AGM in November on the subject of the transmitter. He has had a lifetime association with the transmitter. Doug has already presented a copy of his history of broadcasting in Queensland and Papua-New Guinea, titled "On Air", to the Division Office library's heritage section. Doug has also presented an album of photographs of the Bald Hills establishment to the Heritage Panel, for formal presentation in the near future by Queensland Division to the John Oxley Library, home of most of the best of the State's historic photographic records. Moves are afoot to apply the Sanderson research on Bald Hills to the heritage plaquing of the transmitter and its housing. Security and access considerations at a live and vandal-vulnerable site, however, may prevent meaningful plaquing of this extremely valuable slice of Australian broadcasting history.

Main Range Railway

Built in the 1860's, the "Main Range" section of the main western line from Brisbane runs from Murphy's Creek at the foot of the Great Dividing Range through Spring Bluff to Toowoomba along a very tight alignment and through several tunnels. The dimensions of the tunnels are not compatible with the size of modern rolling stock. Passenger traffic along the line has declined in recent years, and the only passenger services now traverse the Main Range section at night.

The survival of services on the line could well necessitate "daylighting" of some of the 130 year old tunnels so that the line can carry goods loads such as coal and grain in larger quantities than the line's current configuration will allow. Queensland Rail are in the process of commissioning a heritage study of the Main Range section, complementary to proposals to increase the capacity of the line. The Heritage Panel plans to hire a rail motor in the autumn of 1995 for an Engineering Heritage field day to inspect engineering aspects of the Main Range section.

Transport Heritage

Perseverance and method have had their reward for Heritage Panel Deputy Chairman Ian Waples, a resident of Toowoomba. The Department of Transport, which now embraces the former Main Roads Department, most of the former Department of Harbours and Marine and Queensland Rail, has appointed Ian as Heritage Manager for assets other than railways. Brisbane is regarded, probably quite properly, as an outlying low lying district of the capital of the Darling Downs, and Ian manages to visit Brisbane Town for most of the Panel meetings. Ian's style is very much "hands-on", museum and collection oriented. He has already established a museum at Bowen Hills, and has approval for a second one at Toowoomba. At the annual RNA Exhibition in Brisbane in August, Ian was to be seen in overalls and leather tunic at the Transport Heritage exhibit, operating a smithy (among other equally frantic activities). The Department of Transport sponsored (26 September 1994) a luncheon for the visit to Brisbane in September of Emeritus Professor Jack Cowan, Board of Engineering Eminent Speaker for 1994.

Mephan Ferguson and Lock Bar

A recent publicity brochure for a large water supply authority had the following description of the materials of its trunk mains: "Steel (boost) and cast iron (locbar)". Thanks to the 1992 Mephan Ferguson biography, autographed by the author James Mephan Ferguson and distributed to members of the National Committee on Engineering Heritage in 1993, the interesting, colourful but inaccurate nature of the description of the trunk main materials has been ever so politely brought to the attention of the water authority, with appropriate reference to the definitive 1992 source.

From the Divisions - Tasmania

Waddamana Power Station

The National Committee has approved the awarding of a National Engineering Landmark to the Waddamana Power Staton in Central Tasmania.

This was the first major hydro-electric power development in Australia, the first stage of 7 MW being completed in 1916 and an additional 42 MW added in 1923.

The Chief Engineer and General Manager fo the Hydro-Electric Department at the time was Sir John Butters CMB MBE FIE Aust, the first Chairman of the Tasmanian Division of the Insitution (1920), the first Chairman of the Canberra Division (1925) and National President (1928) and became Chief Executive of the Federal Capital Commission.

It is expected that the plaque will be unveiled with due ceremony in February 1995.

1D.

Completed Power Station - Waddamana - 1923

From the Divisions - Sydney

Plaquing

There has been increased activity in the award and unveiling of commemorative plaques in recent months. Most have been in the Historic Engineering Marker series of the Institution's Engineering Landmark scheme.

Three HEM plaques were unveiled on 17th April at Prospect Reservoir to commemorate the Upper Nepean water supply scheme (1888) for Sydney Water Board. The Board was also the relevant authority for the HEM plaque unveiling at the thin arch concrete dam (1906) at Medlow Bath in the Blue Mountains, coinciding with the annual country engineers' conference at Blackheath nearby.

Co-operation with other organisations has resulted in the production of a plaque for Martin Place railway station, on the Eastern Suburbs Railway, with CityRail (Sydney) and HEM plaques to be placed on Locomotive 3801 on a November excursion.

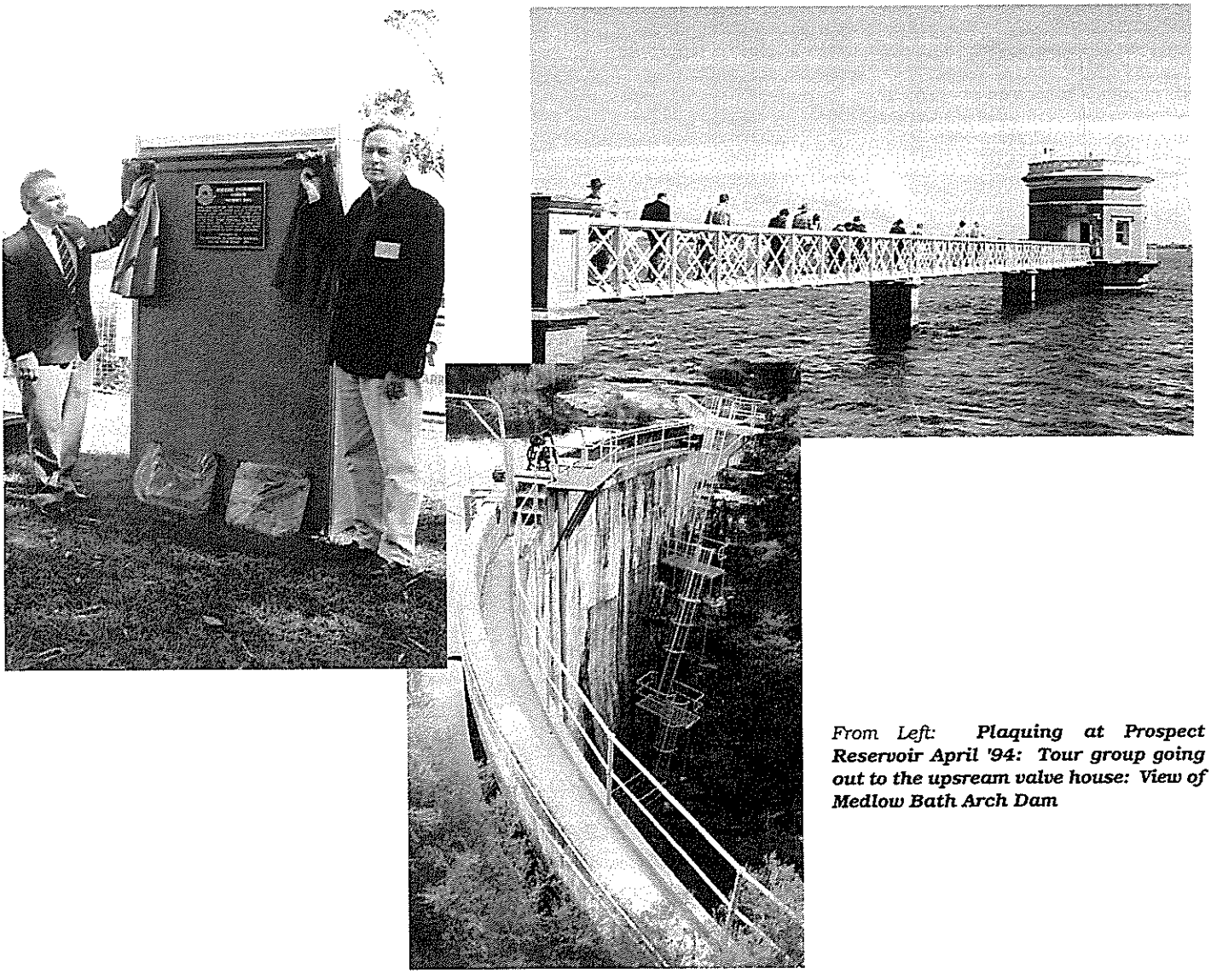
Although it is a modern structure, it is difficult to deny the claim of Sydney Tower as an engineering landmark and appropriate plaques were unveiled there - at a very high level, of course - on 8th September, during National Engineering Week.

I E Aust 75th Anniversary

Dr D Fraser has been active in the preparations for the 75th anniversary of the Institution in October. He has guided the production of the video film: "Construction of the Sydney Harbour Bridge" based on the Henri Mallard contemporary 16mm silent film and later comments by Frank Litchfield, one of JJC Bradfield's assistants. Also during the 75th anniversary celebrations, a HEM plaque will be placed on the 1885 Whipple trusses that were only removed from the Lewisham railway viaduct last year.

❦ ❦ ❦ ❦

From Sydney Division Engineering Heritage Committee, Professor H J Cowan is the current Eminent Speaker of the Institution and will be the keynote speaker at the First Australasian Engineering Heritage Conference in Christchurch. Dr D J Fraser is serving on the Railway Heritage Committee of the State Rail Authority of New South Wales and Mr I G Bowie is on the committee for the Railway Heritage Grants Scheme of the NSW Department of Transport.



From Left: ***Plaquing at Prospect Reservoir April '94: Tour group going out to the upsream valve house: View of Medlow Bath Arch Dam***

A Guide to Sydney's Engineering Heritage

Sydney Division's Heritage Committee has prepared a booklet entitled "Sydney's Engineering Heritage - Walks in the City". It will be launched by the Hon. Robert Webster, Minister for Planning on 18 October.

The area covered is from the Sydney Harbour Bridge to the Mortuary Station (south of Central Station) and from the Botanic Gardens to Darling Harbour.

The purpose is to help both Sydney-siders and visitors to envisage the changes made since the founding of the colony; to understand the social significance of engineering; and to appreciate the skill of the engineers and the part they played in the building of Sydney.

Apart from describing the history of various works and the needs which gave rise to them, mention is made of the people responsible and anecdotes and minutiae are included for interest. For instance, the GPO carvings; the winged hour glasses on the gate posts of the Mortuary Station; and the fact that a prime motivation for the Farm Cove Seawall, was to get rid of the smell of the raw sewage stranded on the mud flats at low tide.

At times a structure is used to symbolise a much greater achievement than the monument itself. For instance Central Station, to tell the story of John Whitton "The Father of the Railways" and of the part the railways played in creating wealth and in opening up the state. Similarly, an Egyptian-style obelisk (which is really a sewer vent) is used to tell of the services under the pavement and of the introduction of water supply and sewerage to Sydney.

Walks of various duration, from 45 mins to 3 hours, are offered. Of the four basic walks, two are named after Governors Phillip and Macquarie and two are named after eminent engineers, John Whitton and Dr Bradfield.

The booklet of 34 pages is well illustrated, has a fold out map identifying the sites described and other historic buildings, and will be sold for about $6.

The Historic Engineering Plaques of Australia

On behalf of the National Committee on Engineering Heritage, Sydney's Heritage Committee has produced a booklet about the works which have so far been awarded historic engineering plaques by the Institution.

The booklet will be released at the Engineering Excellence Awards dinner in Sydney on 21 October, when each guest will receive a copy. The dinner is part of the Institution's 75th Anniversary celebrations.

The works are significant for diverse reasons. Between them they have contributed to the advancement of engineering knowledge and technology, to the enhancement of public health, to the establishment of industry, to the facilitation of trade, to the opening up of the hinterland, to providing public amenities and to lightening the burden of work. Many have contributed to the creation of wealth and prosperity, and all exhibit qualities of excellence.

The information provided for each work includes (as appropriate) the location and owner of the work and a photo; the type, location and wording of the plaque(s); and a biography and in most cases a portrait, of the engineer or person responsible for the work.

Don't Forget . . .

FIRST INTERNATIONAL CONFERENCE ON ENGINEERING HERITAGE

Newcastle NSW Australia

Date: Monday 23rd through to Wednesday 25th September 1996

Theme: Engineering Heritage Shaping the Future

Caring for Our Industrial Heritage

The importance of Australia's industrial heritage and the need to conserve it was addressed by Ms Sharon Sullivan, Executive Director of the Heritage Commission, at the Conference on Industrial Heritage in Western Australia. This is an excerpt from her speech:

'Industrial heritage' is an integral part of the National Estate. It is included under subject categories and themes, rather than as a general heading of 'industrial heritage' in the Register of the National Estate.

Defining Industrial Heritage

The International Committee for the Conservation of the Industrial Heritage (TICCIH) defines 'industrial heritage' as including physical evidence, such as landscapes, sites, structures, plant, equipment, products and other fixtures and fittings; as well as its documentation, consisting of both verbal and graphic material, and the records of the memories and opinions of the men and women who have been involved.

A search of the Register of the National Estate database for 'industrial heritage' based on this type of definition is difficult because of the imprecise nature of their complex concept, the Commission's own criteria-based assessment and the structure of the Register database itself.

However, a simple search of the Register database, using the Commission's group codes, reveals more than 650 registered places throughout Australia which can be described as 'industrial heritage'.

The actual number is probably higher because of the difficulties of searching the database for this type of place.

These significant places relate to the various industrial and engineering activities which have been undertaken in this country since 1788.

Of these places, more than 90 are in Western Australia, for example, places related to the mining industry, the timber industry, wharves, railway places, bridges, roads, flour mills, a sealer's oven for baking bread, steam pumping station, a brewery, the remains of foundries and lighthouses and shipwrecks.

Shipwrecks

Many shipwrecks, of course, pre-date the European settlement of Australia, such as the *Zuytdorp*, a ship of the Dutch East India Company which was lost in the winter of 1712 on a voyage from Holland to Batavia (now Jakarta).

Of the five East India Company ships know to have been wrecked off the coast of Western Australia (the earliest being the *Trial* in 1622), the *Zuytdorp* is the only wreck from which survivors did not reach Batavia to tell the tale.

The remains of the ship are of vital significance as they hold the only known clues to the wreck and the fate of the ship's passengers and crew.

In our database we have information on some 107 shipwrecks around Australia, 63 of which are found in Western Australian waters. Of these, 43 are entered in the Register of the National Estate.

The question about whether there can be an all encompassing strategy for industrial heritage is a difficult one, but it is clear that there needs to be strategies for the identification and conservation of particular elements of such heritage.

The following story illustrates well why there needs to be public education and recognition of industrial heritage as a worthy part of Australia's national estate.

Geelong Wool Store

The Dennys Lascelles Austin Wool Store, also known as the Bowstring Trust Building or the Geelong Wool Store, was demolished in 1989. An example of the most advanced concrete construction of its time in 1910, the woolstore possessed the largest reinforced concrete roof span in the world.

The woolstore was one of only two structures in Australia which had been identified as being built using the Considere system. This involved the use of spiral reinforcing wound around the outside of the bars, with all the members taking compression.

The bowstring trusses, six huge paired girders like three bidges, supported the roof.

Demolition of the wool store was allowed to proceed by the then Victorian Minister of Planning and Environment's decision in late 1989.

At this time, there was little recognition of the engineering achievements in the structure, or of the significance of industrial heritage generally.

The Commission was unable to save the building as it was not owned by the Commonwealth Government and therefore no Commonwealth Government action or approval was required in the decision-making process which led to the demolition.

Unfortunately, the outcries of those government officials and private citizens who sought to save the building were not heard.

Need for education

'Industrial heritage' is not a simple concept and the Commission has tackled it by focusing on industries, themes and regions.

Public education about industrial heritage is also very important.

We need to ensure that all Australians, as well as professionals and government officials understand the importance of identifying and conserving industrial heritage so that we can better understand our own history and society.

From Heritage News Volume 16 No. 2 page 10

Port-Related Structures: Lighthouses. Albany Maritime Heritage Study

The WA Maritime Museum has been awarded a grant of $13,500 for a study of the history and physical remains of lighthouses on the Western Australian coast which are under-represented on the State and National Estate Registers. This study follows on from a similar study of Port-Related Structures (jetties, wharves etc.) (Principal researcher - Dennis Cumming, Institution of Engineers) and the Albany Heritage Study (Principal researcher - Adam Wolfe). These studies (supervised by Mike McCarthy, WA Maritime Museum) are developing a strong link between the Department of Maritime Archaeology and the Heritage Council of WA and draw attention to the need for protection of maritime sites not covered under shipwreck legislation.

From the Australasian Society for Historical Archaeology Inc Newsletter Volume 24.2 Page 3

❦ ❦ ❦ ❦

RESEARCH NOTES
Privy Secrets?

Investigations overseas of the organic remains excavated from latrines, privies and cesspits have yielded much rich and varied information on the diet and health of the former users of these structures, building a more complete picture of peoples' lives in the past through the study of some classes of archaeological information that may otherwise be overlooked.

This thesis investigates the procedures used to recover organic material from latrine deposits, in particular the eggs of helminth parasites, the presence of which are a diagnostic tool for the positive identification of latrine deposits. The major part of this research involves the development of techniques suited to recovering these materials from Australian deposits. Material from two sites was analysed for this study: the latrine from the site of Regentville, near Penrith, and the cesspit from the Jobbins Buildings in the Rocks.

From the Australasian Society for Historical Archaeology Inc Newsletter Volume 24.2 Page 9

❦ ❦ ❦ ❦

From Hon M. Photios, M.P. - Copy of letter from the Minister for Transport

"Thank you for your representations of 1st March on behalf of the Meadowbank-West Ryde Progress Association, regarding the disused rail bridge across the Parramatta River at Meadowbank. State Rail advises that this matter has been referred to Eric Mann, its Regional Property Manager, North West, to determine if Parramatta and Ryde Councils would be interested in establishing a joint project to enhance the bridge's community value ... I trust there will be a suitable outcome to this"

Taking the initiative to save the John Whitton designed Bridge is Concord Council, who have submitted a Heritage Grant Application to investigate future alternative uses of the lattice truss bridge. Should the application be successful, Concord Council will be required to provide $5,000 to match the Heritage Grant of the same amount and has asked Ryde City Council to give consideration to providing $2,500 towards the feasibility study.

From Meadowbank- West Ryde Progress Association Newsletter No 217

Alice Springs Telegraph Station

The Heritage Commission recently visited the Alice Springs Telegraph Station National Park during its meeting in Alice Springs.

The Telegraph Station is the last well-preserved reminder of Australia's Overland Telegraph Line which stretched for 3,200 km from Darwin to Adelaide and is listed in the Register of the National Estate.

The telegraph station is set in 445 hectares of bushland and contains at least 14 Aboriginal sacred sites, dreaming pathways, meeting and ceremonial places of importance to Aboriginal people.

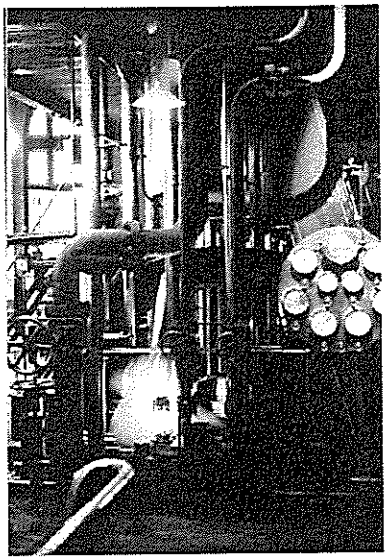
The station was established in 1872, was operational until 1932 and became a focus for settlement in the Alice Springs area.

A major pioneering achievement in Australian history, the construction and operation of the Darwin to Adelaide Overland Telegraph Line opened a new era in telegraph communications between Australia and the rest of the world and was a vast undertaking.

The Telegraph Station was the largest of the twelve repeater stations in the Overland Telegraph Line and has been extensively restored. The national park is administered by the Northern Territory Reserves Board.

from Heritage News Volum 16 No. 2 page 12

❦ ❦ ❦ ❦



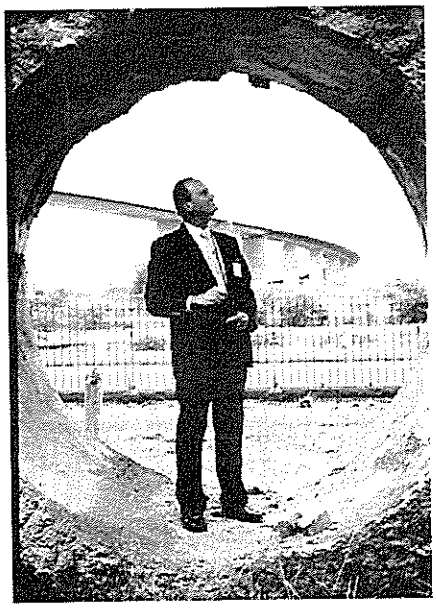
Historic Engineering Marker
Spotswood Pumping Station
1897 - 1965

Spotswood Pumping Station

An Historic Engineering Marker was unveiled on Wednesday 13th Arpil 1994 at the courtyard entrance to the Spotswood Sewerage Pumping Station during Heritage Week and as part of the National Engineering Convention in Melbourne. The former Spotswood Sewerage Pumping Station is now a key component of "Scienceworks", part of the Museum of Victoria, The grand steam pumping engines in two halls are progressively being restored and one is currently activated by compressed air.

The official unveiling ceremony, was presided over by the Chairman of the National Committee on Engineering Heritage, Tony Moulds. following a welcome by the Director of Scienceworks, Boyce Pizzey, the outgoing President of the Institution of Engineers, Australia, Dr Brian Lloyd then reminisced on his early days as an engineer when he had responsibility for the Spotswood Pumping Station, and he then invited the Hon. Haddon Storey, Minister for the Arts to unveil the plaque.

Brian Lloyd's speech particualrly comes to mind. He pointed out that in romanticising the technology of the steam age we shouldn't lose sight of the often repressive work place cultures and environments that existed then. There were great social differences through all levels of the work place, right down the line from the superintendents to the lowliest lad that crawled into and cleaned out the fire grates. From personal experience he reflected on how the regimented, rigid and entrenched work practices, that still existed long after the pumping engines were preplaced by electric motors, were finally phased out when the Spotswood Sewerage Pumping Station was superseded in the 1960's and operations were moved to the new pumping station at Brooklyn.



Top: *End View of Pumping Engine*
Left *A C Moulds withing section of Sewer Main*
Right: *Plaque unveiling*

Thomas Hawksley, FRS (1807 - 1893)

Last year marked the centenary of the death of the civil engineer Thomas Hawksley, who became nationally (and internationally) famous as one of the great 19th century water engineers.

He was born at Arnold, near Nottingham, on 12 July 1807, and was educated at the old Nottingham Grammar School, where he showed a particular interest in mathematics, geology and chemistry.

At the age of 15 he was articled to an engineer and surveyor in Nottingham, whom he subsequently joined in partnership; the practice continued (finally with Hawksley on his own) until he moved to London in 1852. In 1830 he was appointed by the second of the two water companies then in Nottingham to undertake the design and construction of the Trent Waterworks, with a pumping station adjoining the river at Trent Bridge, where clear water was obtained by filtration through beds where clear water was obtained by sand and gravel. (The first company took its supply from the tributary River Leen near the Castle Rock).

The distribution system that Hawksley installed was the first to be successfully designed so that the pipes were constantly charged under pressure, thus allowing consumers to draw water at any time. This system was generally considered impracticable then because of the difficulty of designing pipework and especially fittings that did not leak seriously, and the usual practice was to charge the pipes for a short time once a day (or even once in two days) in order to fill cisterns. Hawksley undertook the design of better fittings that could easily be repaired or replaced when necessary, and he managed to overcome the resistance of the local plumbers to using them.

In 1845 the two water companies amalgamated to form the Nottingham Waterworks Company, and Hawksley was put in charge of the whole enterprise. He constructed the Basford pumping station in the north of the borough for drawing water from wells in the new red sandstone. This pumping station remained in operation for more than a century, with its Jacobean-style pumphouse, ornamental cooling pond and three Hawthorn compound beam engines, one of which is now the centre-piece of the Wollaton Hall Industrial Museum in Nottingham. The site now accommodates offices of Severn-Trent Water, and everything of Hawksley's has gone except a flight of stone steps.

Hawksley remained the Waterworks Company's Engineer until the town's water supply was taken over by the Corporation in 1880, when the technical responsibility passed to the Borough Engineer, M O Tarbotton.

It was not, of course, a full-time occupation for Hawksley, for his private practice was growing. About 1842 the Government set up a Health of Towns enquiry to investigate the possibility (which not everyone accepted) that inadequate water supplies and drainage had an adverse effect on public health. Because of his advocacy of the constant-pressure system, Hawksley was asked to give evidence. He thus gained a platform for announcing his system to the world, and ably defended it against all critics. The report of the enquiry, published in 1844, had an immediate effect on Hawksley's reputation, raising him from the status of a local engineer to a nationally eminent one, and numerous authorities responsible for water supplies started to approach him for advice.

Hawksley constantly emphasised the necessity of decent housing conditions for working families. Most towns suffered from a lack of room for new, sanitary housing. In Nottingham the situation was made worse by the refusal of the burgesses and freemen to allow the borough fields surrounding the town to be enclosed and built on, thus increasing the demand for land and the density of building within the town, with the consequence that Nottingham had the worst slums in the country. Hawksley was a leader of an Enclosure Party which prepared a Parliamentary Bill for enclosing the common land; it also included clauses requiring some minimum sanitary provisions for houses. Despite the opposition of the burgesses, the slum landlords and the Corporation itself, the bill received the royal assent in 1846.

Hawksley moved to London in 1852 and set up his practice as a civil engineer in Great George Street, and from then onwards he never looked back. He claimed (and there is no reason for doubting it) that he had designed and constructed more than 150 waterworks, and there were few towns of any size in Britain that did not consult him. For Leicester he made a large dam and reservoir at Thornton in Charnwood Forest. For the Sheffield Water Company he reconstructed the Dale Dyke dam near Bradfield, west of the town, after it had collapsed in 1864 (causing a heavy loss of life), and made three more impounding reservoirs in the vicinity. He had reported on the matter jointly with James Simpson and J F Bateman, but Hawksley was then designated as the Engineer for the scheme. The Sheffield Corporation took over in 1887 but he continued as their consultant.

His most spectacular work was (and is) that done for Liverpool Corporation. First came the construction of three major dams and reservoirs about 30 miles from the town, at Rivington and Anglezarke near Horwich in Lancashire, known as the Rivington Pike scheme (completed in 1857, then the largest water supply scheme ever done). After consultation with J F Bateman and the Corporation's Borough Engineer, G F Deacon, he then recommended the construction of the great masonry dam (his only major masonry dam) to form the Lake Vyrnwy reservoir in mid-Wales, and the scheme was carried out under Hawksley's direction.

Of all the many pumping stations that he installed, only one still exists with its mechanical plant in original condition, at Ryhope in County Durham, which was built in 1868 for the Sunderland and South Shields Water Company. Here the two Hawthorn beam engines, which ceased pumping in 1967, have been taken over and are maintained by a trust.

He gave advice on water supply schemes abroad, and received decorations from several foreign governments, including Austria, Denmark, Sweden (where he installed a waterworks at Stockholm) and Brazil. On a visit to Warsaw in 1863, where he was engaged on a waterworks and sewerage project, he narrowly escaped capture by a band of revolutionaries. He carried out main drainage schemes in a few towns, and, with others including (Sir) Joseph Bazalgette, gave advice to the metropolitan Board of Works on the drainage of London. As late as 1892 he gave evidence to a Royal Commission on London's water supply, and advocated the use of the Thames as a source. He installed gasworks in several towns, including Nottingham.

Thomas Hawksley died on 23 September 1893 at his home in London, having remained active professionally until a week before. A large memorial plaque to Hawksley and his wife, which used to be in the Nottingham High Pavement Chapel where they had been worshippers, is now displayed in the engine house at the Wollaton Museum, facing the beam engine.

!!! Old Boilers Wanted !!!

The Yarloop Steam Museum, Yarloop, Western Australian badly need a second hand boiler or steam generator to enable additional heritage steam engines to be run.

A group of country based volunteers have collected together a number of steam driven engines from old steam driven sawmills. They have been installed in a building at the old Yarloop Timber Mill (130km south of Perth) together with two old rivetted steam boilers, also from old timber mills. Both these boilers have only a limited life before they will become delicensed.

There is now a need for a further boiler or steam generator to enable additional steam plant to be run.

Brief Specification:

Type ..... Shell / Fire Tube
Pressure ..... Approximately 700 kPa
Steam Flow .... Approximately 500 kg per hour
Rating ..... Approximately 300 kw
Design ..... Preferably to AS 1797

Would anyone knowing of any plant anywhere in Australia that might meet this request please contact Bruce James, C/- Institution of Engineers, WA Division, 712 Murray Street Perth, WA 6005.
Phone (09) 321 3340 Fax (09) 481 4332.

Bridges Approach the End of Their Lifespan

To most people, a timber bridge is a timber bridge, no more than a bunch of piles and beams and planks. The Victorian landscape was once studded with these simple sturdy structures. They crossed countless rivers, streams, culverts and gullies. They carried steam trains and later motor vehicles to the most distant parts of the state. They permitted the passage of the early settlers to the unexplored and untapped richness of the interior.

But, like so many of the humbler parts of our heritage, wooden bridges are steadily being wiped from the landscape. It is estimated that two to three of them disappear from Victoria's byways each week. Considering that only an estimated 3000 remain, it is hardly surprising that alarm bells have begun to sound among preservationists.

Many timber bridges are simple structures on railways or country roads. These are being replaced by prefabricated concrete bridges or hoops of reinforced corrugated iron. But even the grander trestle bridges are prone to demolition.

The National Trust of Victoria has just begun a two-year, $35,000 study of Victoria's surviving wooden bridges.

Mr David Maloney, who is co-ordinating the project, said that Victoria's timber bridges tended to be humble in comparison with the grand structures that spanned some rivers in New South Wales. "In Victoria we haven't really got the landscapes," he said. "The thing about timber bridges is that they tend to be characteristic rather than outstanding."

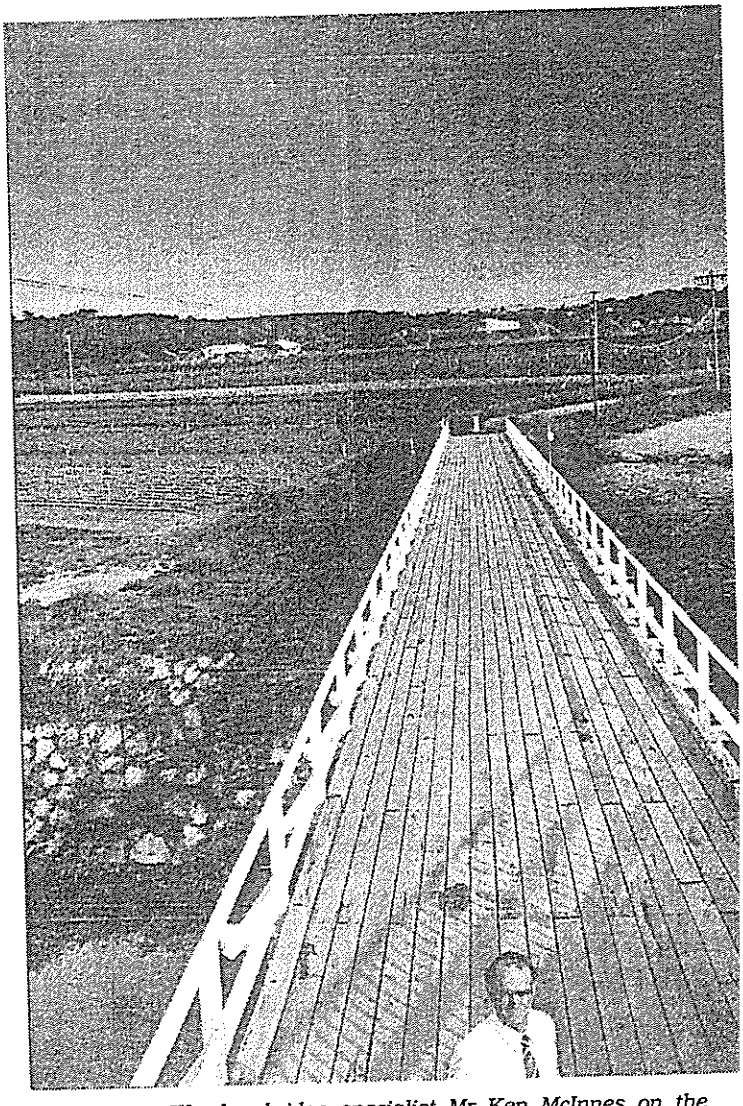
There are some exceptions, most of them railway bridges. One of the most famous wooden bridges in Australia is the trestle bridge that carries Puffing Billy across a creek gully at Selby in the Dandenongs. Other notable trestle bridges are at Noojee and at Kilcunda, both in south-west Gippsland.

Mr Ken McInnes, an engineer and chairman of the Trust's timber bridges committee, said that while Victoria's timber bridges were not necessarily spectacular "what we have got are a lot of different types of bridges".

The committee is surveying local councils, Vic Roads, the Public Transport Commission and other public utilities.

While wooden bridges are typically found in country areas the survey has identified a handful in the suburbs. Among them is the Arundel Road Bridge, which spans the Maribyrnong at Keilor. Dating from 1906-07, it remained in use until recently replaced by a concrete bridge.

After tenders for the demolition of the bridge had been advertised, preservationists began a concerted campaign to save it. Now fully restored, it abuts the new bridge.



Way to go: *Wooden bridge specialist Mr Ken McInnes on the dilapidated Arundel Road structure at Keilor*

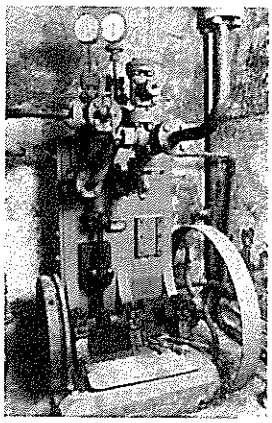
From the Divisions - South Australia

On the morning of Saturday 3rd September the RARE (Restoration of Ancient Refrigeration Equipment) Committee launched a project to restore what may be Australia's oldest domestic refrigeration plant. The system is installed in the basement below the kitchens of Urrbrae House on the Waite Agricultural Research Institute campus of the University of Adelaide; its rehabilitation is part of a restoration and development plan for the whole Urrbrae House precinct.

Urrbrae House was the former family home of pastoral pioneer Peter Waite. Peter Waite was born near Kircaldy, Fifeshire, Scotland in 1834 and as a lad was apprenticed to an ironmonger in Edinburgh. In 1859 he arrived in Melbourne and shortly after joined his brother James on his property near Terowie in South Australia. In the ensuing years his fortunes prospered so that, in partnership with Sir Thomas Elder, he eventually owned extensive interests in a number of pastoral properties. Peter Waite was well known for his innovative approach to pastoralism; he demonstrated the advantages of fenced properties, importing 265 tons of fencing wire from England in 1870, and, realising their worth in our arid environment, bred camels and donkeys extensively. In 1874 Peter Waite's business interests brought him to Adelaide and he purchased 'Urrbrae'. The original Urrbrae property had been established in 1839, and in 1844 the then owner constructed a single storey house. Fifteen years after his purchase of the property Peter Waite decided to rebuild the old home and by the end of 1889 a two storey mansion of thirty-five rooms had been erected. The new home reflected Peter Waite's innovative outlook, featuring such novelties as a tiled roof and a 32 volt DC lighting system supplied from a large bank of batteries. The battery house contains a plinth for a generator which seems to have been driven initially by a portable steam engine located outside the building, with the flat belt passing through a steel-doored slit in the wall. Later the steam engine was replaced with an oil engine.

The refrigeration plant was installed in 1895 by Wildridge and Sinclair of Pitt Street, Sydney, using a compressor built by the Linde British Refrigeration Company of London. Dr. Carl Linde had patented a new compression process using liquid anhydrous ammonia in 1873, and in 1876 produced the first commercial machine operating on this system. Refrigeration in various forms had been in use for a number of years: John Gorrie, an American, is credited with having invented the first practical refrigerating machine in 1849; the first meat freezing works in the world was set up at Darling Harbour, Sydney, in 1861; and in 1874 the New South Wales Fresh Food and Ice Company was set up, using ammonia compression machinery. However, at the time the plant was installed at Urrbrae, domestic refrigeration was a novelty and the unit may be the first adaptation of industrial refrigeration technology for domestic use in Australia.

The Urrbrae House compressor is a vertical, single cylinder, double-acting unit with spring closed poppet valves. The piston rod is driven by a crankshaft and crosshead arrangement running at 120 rpm. The original hand tinted layout drawing, which has survived in the Waite archives, shows a steam cylinder adjacent to the compressor cylinder, both coupled to a common crank-shaft. However, although there is a second crank on the crankshaft and mountings for a steam cylinder on the cast iron bed, none was supplied. Peter Waite opted instead for an electric motor supplied from the house's 32 volt two-wire DC system driving the crankshaft by means of a flat belt. The motor has not survived, although its plinth remains. However, detective work by the committee's chairman, Ray White of White Refrigeration Pty Ltd, using a customer list in a Wildridge and Sinclair catalogue of c. 1910, has located a General Electric induction motor that used to drive a similar Linde compressor in a butcher's shop in Broken Hill. The 8 hp motor was designed for 40 cycles at 550 volts, and a no load speed of 800 rpm, but was rewound some years ago for present supply conditions. it has been purchased and will be used to drive the Urrbrae compressor.



The condenser is integral with the vertical compressor bed-plate, consisting of a number of wrought iron coils carrying the refrigerant and contained in a cast iron chamber through which cooling water is circulated. The evaporator consists of a large array of wrought iron tubes contained in an air plenum. Air is cooled by being drawn over the evaporator tubes by a fan of unusual design, driven from the motor shaft via a rope belt and layshaft.

The fan discharges into a wooden duct which conveys the cooled air to three wood-lined cold rooms. The air flow to the three rooms can be controlled by opening and closing a number of hinged flaps and sliding shutters, both into the rooms and within the ductwork itself, the latter being operated by pull wires terminating in brass acorns. The first room, closest to the evaporator plenum, was used for meat storage. It was possible to divert the full flow from the fan into this room to provide rapid chilling of the meat. The second room has a false ceiling of corrugated iron, the cold air passing through the ceiling space rather than directly through the room; this was probably to protect fruit and vegetables from chill burn due to direct contact with moving chilled air. The third room was a general purpose cold store, the chilled air passing directly through the room. The discharge air from the rooms is ducted back to the evaporator plenum. A small hinged flap in the wall of the second room, leading to a vertical duct, seems to indicate that it may have been possible to divert cool air to the upper rooms of the house in summer. The head, jambs and threshold of the 200mm thick cold room doors are angled and lined with blankets to ensure a good seal. Control of cold room temperature is by manual adjustment of the regulating valve, room temperature being monitored by a thermometer inserted in a brass pocket in each of the cold room doors.

Qualified refrigeration mechanics in South Australia have been invited to participate in the restoration of the plant, under Ray White's direction. Research is being conducted into the original methods of construction and materials used to ensure that the plant is restored as closely as possible to its original condition. It is planned to have the restoration complete, and the plant operational, in time for the National Conference of the Australian Institute of Refrigeration, Air Conditioning and Heating to be held in Adelaide in May 1996.

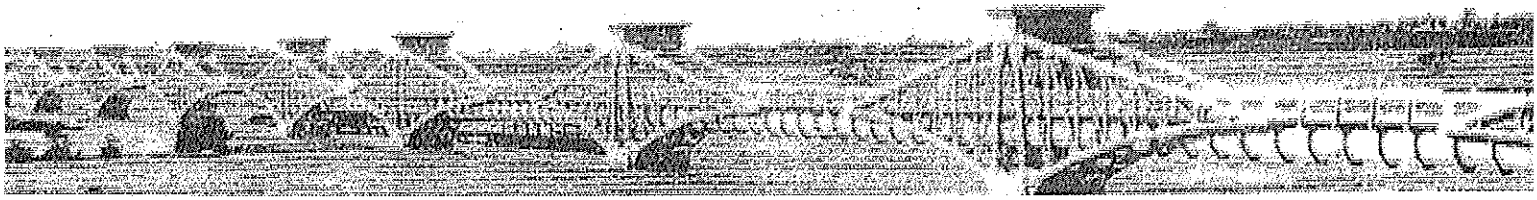
The committee responsible for the restoration would appreciate any information relevant to this or any other refrigeration plant built in Australia before 1900 that may have survived. Written communication should be sent to The Curator (Ms Yvonne Routledge), Urrbrae House, The Waite Campus, The University of Adelaide, Glen Osmond, SA 5064. Telephone communication on general matters should be directed to Ms Routledge on (08) 303 7425; technical calls should be directed to (08) 332 9100.

"Geelong's Parthenon" Hanging in the Balance

Hidden from highway traffic and the world at large, Geelong's 80-year-old aqueduct straddles the Barwon like a dormant monster. Even many Geelong people don't know it is there, yet the fate of this gigantic, though elegant, concrete sculpture shapes up as the year's greatest heritage challenge.

The aqueduct, which carried the city's sewage pipeline over the Barwon on its way to the ocean, is crumbling. A cost estimate is $9 million for restoration, which could take 30 years. It was decommissioned last year and, declared unsafe, can serve no practical purpose. It is an economic liability. The Barwon Region Water Authority wants to knock it down.

And yet there are academics, architects, ordinary folk and engineers of the kind Mr John Cain described as going soppy under the armpits at the though of such



structures - fools, dreamers and fighters of lost causes, who are mobilising to save the "useless" thing, defying the decree of obliteration as redundancy's logical consequence.

Redundant? Lorraine Huddle, an architectural historian, reminded readers in a letter to the 'Geelong Advertiser" that the Colosseum in Rome is redundant. The Great Wall of China, she pointed out, is obsolete, and mostly derelict. The Pyramids are obsolete. Another greater aqueduct, the Pont du Gard at Nimes, France, cannot be used for its original purpose, but is priceless as a monument to Roman engineering genius.

The Eiffel Tower, a useless symbol for the Paris exhibition of 1889, was retained when its companion masterpiece, the re-usable Machine Hall was demolished. "And now Geelong has the Barwon aqueduct, a most stunning tourist attraction on a par with the Eiffel Tower." To which Mr Dick vander Molen, a senior lecturer in civil engineering at Melbourne University added: " It may sound somewhat over the top, but I would rank the aqueduct with the Parthenon and the Colosseum. What those buildings are in world historic significance, the aqueduct is in Australian construction history."

A few minutes' drive from the central business district brings you to Geelong's Parthenon. It lurks behind factories of suburban Breakwater on an obscure flood plane reached by back streets with names recalling the area's historic role - Fellmongers Road, Tanner Street, Leather Street. Coming across this immense yet delicate thing in such a setting seems unreal.

Fourteen lacy, diamond-shaped cantilever towers, each seemingly resting lightly on the surface, stretch away as straight as a reed towards the horizon. Their strong, confident shape strikes a familiar chord - the design is based on Scotland's steel Forth Bridge. It was built by men with horses and drays when Geelong was sewered, between 1913 and 1915, and its length of nearly 800 metres is twice that of the main river span of the West Gate Bridge, Construction was by the Considere system of reinforced concrete in which heavy spiral winding increased the compressive strength of the concrete. Its importance was heightened four years ago when the only other Australian example of Considere, the Bow Truss woolstore in central Geelong, was demolished by a developer.

The aqueduct and the woolstore were designed by E G Stone, and the aqueduct is thought to be the last remaining example of his work. A working party has been formed to save it. The water authority says it cannot pay for restoration and, even if it could, maintaining the aqueduct would breach its statutory responsibility. The board is worried about legal liability of personal accident by falling masonry.

The chairman of the authority, Mr Frank De Stefano, says: "You realise how much it has deteriorated when you walk across it. If one section came down the whole thing could collapse like a house of cards."

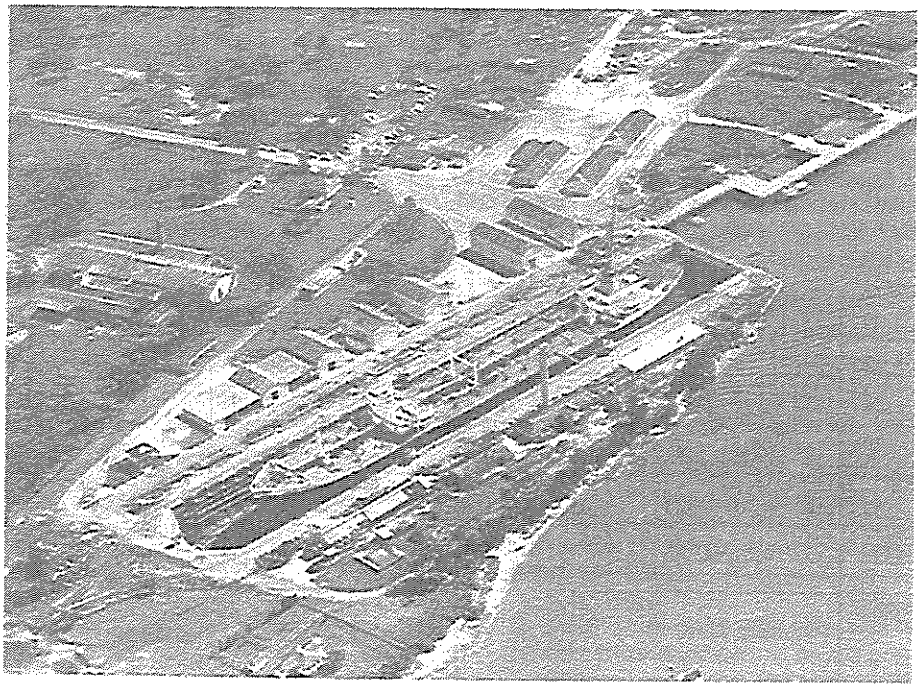
The authority is not deaf to heritage concerns. The structure is listed by the Australian Heritage Commission, the National Trust and the Historic Buildings Council. The authority will seek a demolition order from the HBC but, if successful, will postpone demolition until the working party's deadline runs out. It has promised the estimated cost of demolition - $500,000 - towards restoration if there is an acceptable plan.

Already, cycle and foot paths run from near this point down the river. It remains only to push the path another few hundred metres to the repose of the aqueduct which, when made safe, would provide a wonderful pedestrian bridge. Cutting through four outstanding parks, the trail, with proper interpretation, would string together such features as the workers' cottages and historic bridge at Fyansford, the single-lane Queens Bridge, still in use, Aboriginal camp sites in Belmont Common, two National Trust-owned mansions, several other industrial relics and the historic breakwater.

The death sentence for the aqueduct, even with a year's reprieve, seems a precipitate and unsatisfactory end to the dilemma of this classical structure. One thing needing clarification is whether it does actually constitute a danger. Left alone, it might stand for another 100 years. Geelong booed and hissed at the Bow Truss lynching. This time it ought to get behind its dreamers and fools if it cares about its past - and its future.

Cairncross Graving Dock, Brisbane

Mr Eric Brier, BE, FIEAust, FICE, FArbA



Cairncross Dock was built during the war years 1942-45, to serve the needs of the Australian Navy and the fleet of merchant vessels supplying the materials of war to Australia. It was opened on 15 September 1944. Due to a number of factors, use of the dock declined during the post war years. Major improvements, which were completed in 1976, failed to sustain the dock which closed in 1987. It is anticipated, however, that the dock will be able to reopen under the management of a private consortium with international participation, 50 years after its original opening in 1944.

1.0 THE PORT OF BRISBANE

With the opening up of the colony to free settlement in 1842, Brisbane became the main port of entry for the Moreton Bay area, under the jurisdiction of the Government of New South Wales. In 1859 Queensland became a separate Colony and Brisbane the capital of the new Colony. The growth of the colony brought increased shipping to the Port of Brisbane and by 1875 it was resolved to build a graving dock at South Brisbane to service the dredges and barges of the Harbours and Rivers Department and other vessels.[1] The dock was officially opened on 10 September 1881 at a cost of £83838 and was capable of taking vessels up to 97.5m (320ft) in length. This was extended to accommodate vessels up to 128m (420ft) in 1887. Use of the dock declined after 1895, partly because the size of vessels using the port had increased. The growth of the city and the increased size of ships resulted in the building of wharves downstream of the city centre. The decision in late 1934 to construct a bridge across the river at Petrie Bight and the construction of a large dock capable of accommodating ships of the size now using the port.

2.0 CAIRNCROSS DOCK

2.1 Authority

Japan entered the war in 1941 and by the end of that year the seriousness of the war was such that Australia was fully mobilised. Those able persons not in the services were drafted into Civil Defence. The Allied Works Council was established on 26 February 1942 and Mr JR Kemp who was Commissioner Main Roads, and the Co-ordinator General Public Works Queensland, was appointed Deputy Director of Allied Works responsible for work in Queensland and the Northern Territory. By that time the urgent need for a graving dock in Brisbane capable of repairing merchant naval vessels was recognised. The Queensland Government entrusted the investigation and construction of such a dock to the Co-ordinator General of Public Works, Mr JR Kemp. He immediately appointed a Board to advise and consult with him on matters of design and construction in close liaison with officers of the Royal Australian Navy. The Board consisted of Messrs WHR Nimmo, Chief Engineer Stanley River Works Board (Chairman), CM Calder (Main Roads Commission) who acted as Construction Engineer throughout the construction of the dock, WT Evans (Engineer Harbours and Marine Department), D Fison, (Department of Harbours and Marine), LJ Price, (Chief Engineer Brisbane City Council and Assistant Deputy Director General of Allied Works Council Queensland) and GW Watson, (Department Co-ordinator General). The staff of the Stanley River Works Board were entrusted with the preparation of plans for the dock with the exception of the caisson and river works, which were the responsibility of the Department of Harbours and Marine.[2]

2.2 Geology

The site under consideration was an outcrop of sandstone on the south bank of the river opposite the Hamilton Retaining Wall and at the northern end of Thynne Road. JR Kemp discussed the geology of the site with Dr Whitehouse of the Geology Department University of Queensland on 24 February 1942 and the following day an inspection was made by Messrs Nimmo, Calder, Ball (Government Geologist), Perkins and Smith. Mr Ball stated that the general structure was Bundamba sandstone associated with shales overlying schist. It was impossible to state the thickness without boring. Dr Whitehouse was instructed to investigate the geology of the site and he reported to the Co-ordinator General on 27 March. The report suggests that the rock would be impermeable and that quarrying would be relatively easy. It did express the opinion that the walls and floor should be faced with concrete.

2.3 *Design*

Darwin was bombed on 19 February 1942 and the battle of the Coral Sea took place between 5 and 8 March.

Meanwhile design proceeded despite the fact that funding had not been agreed between the Commonwealth and Queensland Government and acquisition of the land had not yet been completed. The Board met regularly during March, April and May and meetings were held with representatives of the Navy in an endeavour to reach agreement on design parameters necessary to meet its requirements and also on protective measures considered necessary to minimise damage from enemy attack. At a meeting held on 19 October the following design requirements were agreed:

Length -	suitable for vessels 244m (800ft) long
Width at Sill Level	-33.5m (110ft)
Elevation of Floor	-RL-10.4m (34ft)
Elevation of Sill	-RL-9.1m (30ft)
Coping of dock	-RL 5.2m (17ft)
Distance between faces of outer open Sill and inner Slotted Sill	-15.25m (50ft)
Sill Structures supporting two sills upon which the caisson will bear	-27.4m (90ft)
Floor (average thickness)	-0.6m (2ft)
Altar Piers at 6.1m (20ft) centres	-1.0m (3ft 6 inch) ide
Slotted Sills	- granite lined
Main Pumping Plant	-Reconditioned engine and pump from suction dredge Hercules 1306kW (1750H.P.)
Auxiliary Pumps	-2 x 375mm (15 inch) diameter electrical centrifugal pumps
Cranes	-1 x 40 tonne fixed crane and 2 x 3 tonne mobile cranes
Caisson	-1 x 19mm (0.75 inch) steel plate floating caisson
(Provision was made for water and power services.)	

Serious concern was felt by Mr Nimmo as to the stability of the rock and tests were conducted at Somerset Dam. The design of the dock was undertaken by staff of the Stanley River Works Board under Mr Nimmo's direction headed by Mr EM Shepherd while the design of the caisson and river works were undertaken by the Department of Harbours and Marine.

2.4 *Site*

On 17 August 1942 executive approval was given for the resumption of the site, comprising 47.5ha for the dock site.

The principal properties comprised:

Land	Owner	Area
Resub 1 of Sub 1 of allot 27	Brisbane City Council	5.05ha (12a 2r 0p)
Sub 1 of Por 28	R W Lahey	13.55(33a 24 17p)
Res of Sub 1 of allot 29		5.7ha (14a 0r 27p)
Allot 26	Hancock & Gore	21.8 ha (54a 0r 0p)

Also included were allotments fronting Taylor Street and Lytton Road. Valuation of all the above properties was assessed at $18,242 (£9121) on 19 January 1994. *****

2.5 *Construction*

Construction of the dock commenced in September 1942 and the completion was marked by the docking of the first ships on 22 June 1944.[3] The Co-ordinator General of Public Works arranged for the utilisation of the staff of the Stanley River Works Board and, under Mr Nimmo's direction, to transfer men and plant from Somerset Dam to the works. These workmen, together with others from State and City Council jobs, were subsequently enlisted in the Civil Construction Corps of the Allied Works Council.[4] Initially a large number of tractors, scoops and bulldozers was assembled to undertake the excavation. However, these were removed for service in battle areas and were replaced by power shovels from Somerset Dam and elsewhere. Plant moved to the dock from Somerset Dam included the compressor, tool sharpening equipment, machine tools, 1.1m^3 (1.5 cubic yard) concrete mixer and a 1.9m^3 (2.5 cubic yard) electric Ruston Bucyrus quarry shovel. Two smaller shovels came from the Mackay Harbour Works.

Technical and clerical staff from Somerset Dam were transferred to the project as well as most of the skilled tradesmen. The balance of the work force was conscripted from the Civil Construction Corps, men principally between the ages of 45 and 60 who were not in protected undertakings or in the defence forces. Most of the married tradesmen lived in their own houses in Brisbane, but the bulk of the Civil Construction Corps were housed in a camp on the site.

Throughout the period of excavation, work was carried out for three 8 hour shifts per day, six days per week. The greatest number of men employed at one time was 850, this maximum being retained for a period of two months when concreting and earth works were together at their peak. The quantity of earth removed was approximately 270,000m^3 (350,000 cubic yards) the vast majority of which was sandstone. Approximately 30,600m^3 (40,000 cubic yards) of concrete were placed.[4] The construction of the caisson was carried out by contract between the Co-ordinator General and Evans Deaking & Co Ltd.[3] The total expenditure amounted to $2.47m (£1,235,465) [5] of which the Commonwealth paid $850,000 (£425,000), the balance being borne by the State Government.[3]

The dock was opened by the Governor of Queensland, His Excellency Sir Leslie Wilson on 15 September 1944, and, as stated in the report of the Co-ordinator General for the year ending 30 June 1945, it is "one of the largest docks in the Southern Hemisphere, sufficient to accommodate any vessel capable of navigating the Brisbane River".

3.0 *OPERATION OF THE DOCK*

The immediate objective of building the dock was to service naval ships and "liberty" cargo ships bringing war supplies to Australia. The long term objective was to service future marine trade to the east coast of Australia. By agreement with the Commonwealth, the dock was the property of the State of Queensland, but for the period of the war and for twelve months thereafter, priority for docking was determined by the competent Commonwealth Authority. In June 1945, the Co-ordinator General stated "It is important to note that though a good dock has been constructed in Brisbane, this in itself is not sufficient to attract trade to the port. In future competition will again become the soul of trade. Business will not be directed to the port as it was in time of war, but must be attracted to it".[2] During the war period the dock proved to be of very great value as a defence facility and in post-war years it was naturally utilised for the repair of merchant ships. By 1948, Brisbane being the terminal port for many overseas shipping lines, ships were using the docking facilities prior to their return overseas.[6]

However, during 1959/60 only 26 vessels docked and the dock operated at a loss. The reduction in use was partly due to an increased cost of docking resulting from an over time ban imposed by the Metal Trades Union. During 1966, Sir William Halcrow and Partners was commissioned to carry out a study on upgrading the dock and expenditure of $3,365,000 for this purpose was approved. The work included heavy lift cranes, 365m (1,200ft) of fitting out quay, dock service lift, a 2,500 tonne slipway, improved workshops and administration building. The projected was opened by the Premier, the Hon J Bjelke-Petersen on 21 April 1972 but all work was not completed until 1976. Total cost was nearly $10,000,000. Ownership of the dock passed from the Department of Harbours and Marine to the Brisbane Port Authority in December 1976. Despite every effort to modernise the dock and improve the standard of service, the use of the dock declined. This decline may be attributed to a number of causes including:

- A reduction in the number of vessels of the Australian Coastal fleet from 11 in 1977 to 4 in 1983.
- The improved quality of underwater paint resulted in docking being reduced from once in 2 years to once in 5 years.
- The high cost of docking and repair in Australian docks compared with that in certain overseas docks.
- The longer time required to complete repairs in Australia due to labour awards.
- The risk of delay during docking as a result of industrial disputes.
- The decision by the owners of foreign ships, restricting the docking and repair of their vessels to the Country of Registration.

In consequence of the decline in usage the dock closed in 1987.

4.0 *REOPENING THE DOCK*

Subsequently attempts have been made to reopen the dock. In October 1992 a tender was submitted on behalf of Marinet Pty Ltd in association with Keppel Corporation, a Singaporean conglomerate with interests in ship repair and building, for the right to proceed with plans to redevelop the dock. Formal signing of the agreement to lease the facility is dependent upon approval of Keppel Corporation's participation by the Foreign Investment Review Board, and also agreement by the Port of Brisbane Authority to maintain the dredging of the river from the Port at Fisherman's Island to the dock. [7]

5.0 *CONCLUSION*

This year, 1994, is the 50th anniversary of the opening of the Cairncross Dock. During that time there have been significant changes to the nature of transport from overseas countries and within Australia. The majority of passenger traffic is by air. Bulk goods such as oil, coal, and minerals are transported by vessels too large to enter the Port of Brisbane or use the dock. Within Australia a preponderance of freight is moved by rail and road. Nevertheless, the growth of Brisbane has warranted the construction of a major new Port at Fisherman's Island and this will become increasingly important for the handling of our trade with Asia.

Cairncross Dock is the largest graving dock concentrating on commercial shipping in Australia. There will be a continuing need for such a facility and, should it be leased to a consortium which includes international interests, there is good reason to believe it will attract a share of international dockings.

6.0 *ACKNOWLEDGMENTS*

The author wishes to acknowledge the support and encouragement and information given by a number of people and organisations, especially:

- Mr Evan Richard BCE, who was Works Manager at the time the author worked on the project in 1943.
- Winifred Davenport MIEAust MRINA, author of Port and Harbour Development in Queensland 1824 to 1985.
- Helen Taylor BA Hons, Senior Historian, Heritage Unit, Brisbane City Council.
- Kevin Brown ADRC, GradDip Soc Science, Manager, Management Information Unit, Department of Premier, Economic and Trade Development.
- Graeme Hartland, Major Retired List ARA, Programme Officer Cairncross Dock Yard, Port of Brisbane Authority.

7.0 *REFERENCES*

1. Harbours & Marine Department; *Port and Harbour Development in Queensland 1824 to 1985*; p 209.
2. Co-ordinator General of Public Works, Queensland; *Report for year ending 30 June 1945.*
3. Commissioner of Main Roads, Queensland; *Annual Report for year ended 30 June 1944.*
4. Premier's Department; *Brisbane Graving Dock*; 1946.
5. O'Connor, E A; *Memorandum*; 8 November 1946.
6. Harbours & Marine Department; *Port & Harbour Development in Queensland 1824 to 1985*; p 544.
7. .... Business Queensland; 7 December 1993.